WHAT IS CLAIMED IS:

1. An optical semiconductor device comprising a plurality of semiconductor lasers which oscillate longitudinal single mode laser beams based on a periodic change in refractive index or a periodic change in gain and have been simultaneously formed with mutually different oscillation wavelengths on a single substrate,

said plurality of semiconductor lasers being identical to each other in coupling coefficient independently of the oscillation wavelength.

2. An optical semiconductor device comprising a plurality of semiconductor lasers which oscillate longitudinal single mode laser beams based on a periodic change in refractive index or a periodic change in gain and have been simultaneously formed with mutually different oscillation wavelengths on a single substrate,

said plurality of semiconductor lasers being provided with diffraction gratings having heights corresponding respectively to the oscillation wavelengths.

3. The optical semiconductor device according to claim 2, wherein said plurality of semiconductor lasers are a distributed feedback (DFB) semiconductor laser or a distributed bragg reflector (DBR) semiconductor laser.

4. The optical semiconductor device according to claim 2,

wherein said plurality of semiconductor lasers comprise a laser active layer comprising a guide layer and a multiple quantum well (MQW) layer.

5. A process for producing an optical semiconductor device comprising a plurality of semiconductor lasers which oscillate longitudinal single mode laser beams with different wavelengths and have been simultaneously formed on a single substrate, said process comprising the steps of:

coating a resist on the substrate;

exposing the surface of the resist to a pattern of a plurality of diffraction gratings for setting pitches corresponding respectively to oscillation wavelengths for the plurality of semiconductor lasers and for setting heights which provide an identical coupling coefficient independently of the oscillation wavelength;

etching the substrate in such a manner that the level of etching per unit time is identical;

patterning a mask to give a predetermined shape according to the arrangement of the diffraction gratings;

forming a laser active layer on each of the diffraction gratings using the mask having a predetermined shape by selective MOVPE growth (metal-organic vapor phase epitaxy); and

forming an electrode on each of the top surface of the laser active layer and the backside of the substrate.

6. The process according to claim 5, wherein a larger height of the diffraction grating is adopted for a laser having

a smaller coupling coefficient when the diffraction grating is unchanged.

7. The process according to claim 5, wherein the height of the diffraction grating is set by the opening width of the resist.

8. The process according to claim 5, wherein a narrower resist opening width is adopted for a laser having a smaller coupling coefficient when the diffraction grating is unchanged.

9. The process according to claim 5, wherein

the patterning to give a predetermined shape involves patterning of electro-absorption optical modulators coupled respective to the semiconductor lasers, and

the selective MOVPE growth involves selective MOVPE growth for the formation of an absorption layer in the electro-absorption optical modulator.